

REMARKS/ARGUMENTS

1.) Claim Amendments

Claims 1, 3, 4, 6-13, 16-20, 23, 25, and 27-37 are pending in the application. The Applicant has amended claims 1, 3, 4, 6, 10-13, 16, 17, 20, 23, 25, and 27-34. Claims 2 and 26 have been canceled herein. Claims 35-37 have been added. Favorable reconsideration of the application is respectfully requested in view of the foregoing amendments and the following remarks.

The Applicant has amended claims 1 and 16 to recite the AMR communication system in the body of the claim since the Examiner stated the limitation was given no patentable weight because it was recited in the preamble.

2.) Allowable Subject Matter

On page 6 of the Office Action, the Examiner objected to claim 13, but stated it would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The Applicant has rewritten claim 13 in this manner. Therefore, the allowance of amended claim 13 is respectfully requested.

3.) Claim Rejections – 35 U.S.C. § 103(a)

On Page 2 of the Office Action, the Examiner rejected claims 1-4, 6-13, 16-20, 23, and 29-34 under 35 U.S.C. § 103(a) as being unpatentable over Hamalainen et al. (US 6,477,176 B1) in view of Bruhn (US 6,347,081 B1). The Applicant respectfully disagrees for the following reasons:

A. Codec Mode Information

The Examiner admits in paragraph 7 that Hamalainen does not disclose SID frames in an Adaptive Multi-rate (AMR) system that include codec information. The Examiner contends that Bruhn discloses this limitation. He cites Bruhn col. 3, line 35 -- col. 4, line 21 for showing the SID frames with codec mode information. However, Applicant's reading of Bruhn indicates only that the SID frames are encoded with a

different channel coding scheme than the speech frames. There is no disclosure that the SID frames actually include codec mode information.

Independent claim 1 recites this feature, but also recites the steps of block diagonally interleaving the channel encoded source data, and block interleaving certain of the SID frames. The novelty of these steps is discussed below.

Claim 16 recites that the codec mode information is transmitted in an escape frame in place of a source data frame. The Examiner treated claim 16 as if it was the same as claim 1, even though an entirely new type of frame is recited.

The Examiner's reconsideration of the pending claims is respectfully requested.

B. Interleaving Algorithms

Also of significance is the Examiner's contention that the use of different interleaving algorithms for certain of the SID frames and the channel encoded source data is merely a design choice of the programmer, as stated on page 3 of the Office Action. The Applicant respectfully disagrees. It is the different interleaving of the SID frames that allows the SID frames to carry the codec mode indication with the frequency required for an AMR system.

Conventionally, SID frames are transmitted once per 24 frames over the currently inactive link. The SID frame may, for example, serve to transmit comfort noise information over the inactive link, as is well known. Discontinuous transmission (DTX) using SID frames serves to save radio resources by means of lowering the interference level. Typically, SID frames do not differ from speech frames in the way channel encoding is done. Conventionally, both speech frames as well as SID frames are subjected to block diagonal interleaving so that the radio subsystem can handle the SID frames as regular speech frames, as described in the last paragraph on page 4 of the present application.

The present invention addresses the problem of how to incorporate AMR functionality into a communications system using DTX. An AMR communications system must be able to communicate from the presently listening end to the presently speaking end (that is, over the inactive link) information regarding the codec mode to be utilized. This information must be transmitted sufficiently frequently in order to be able

to cope with the time-varying characteristics of the channel. (See the first paragraph on page 8 of the original application).

The present invention solves this problem by means of providing DTX in an AMR communications system in which silence descriptor frames are transmitted from a first to a second component during the periods of source data inactivity, wherein the SID frames are interleaved for transmission. Certain of the transmitted SID frames are interleaved using a different interleaving algorithm as compared to that used for source data. This enables the SID frames to be used for also carrying codec mode information required for the AMR system. Adopting a different interleaving scheme for the SID frames enables the system to adjust the frequency of the SID frames to the needs of an efficient AMR communication system without sacrificing too much of the benefits of discontinuous transmission. In this respect it is particularly advantageous to use an interleaving scheme like block diagonal interleaving for interleaving speech frames, and to use an interleaving scheme not reaching across plural frames (such as block interleaving) for interleaving the SID frames. In this particular example, it would be possible to transmit twice as many SID frames, due to the fact that the SID frames are interleaved differently than the source data interleaving algorithm. The increased frequency in transmitting the SID frames then allows the SID frames to be utilized for carrying AMR codec mode information over the inactive link.

Thus, the use of a different interleaving algorithm for the SID frames is not merely a design choice, but plays a significant role in adapting the link to optimize performance of an adaptive multi-rate system utilizing discontinuous transmission.

On page 7 of the Office Action, the Examiner cites Bruhn col. 6, lines 10-23 for explicitly disclosing interleaving the SID frames such that certain of the transmitted SID frames are interleaved using a different interleaving algorithm as compared to that used for source data. The Applicant respectfully disagrees. In this passage, Bruhn clearly states that the SID frame is handled in the same way as speech frames. Bruhn states:

The corresponding gross (encoded) bit channel frame is handled in the same way as speech channel frames. Specifically, the coded first SID frame is passed through subsequent processing units, such as an interleaver and modulator used *in a conventional manner*, and it is

transmitted with the regular power level which is used for speech frame transmission.

Thus, Bruhn interleaves the SID frames in the conventional manner (i.e., the same as speech frames). As noted above, conventionally, both speech frames and SID frames are subjected to block diagonal interleaving so that the radio subsystem can handle the SID frames as regular speech frames. Bruhn makes no changes to this conventional interleaving.

The Applicant also notes that Bruhn states in col. 8, lines 15-35 that a second interleaving scheme can be used for the SID frames in addition to the conventional interleaving scheme. The second scheme fills the channel frame parts with gross bits which are otherwise left unused. This process is further explained in the Bruhn article, "Continuous and Discontinuous Power Reduced Transmission of Speech Inactivity for the GSM System" (XP-010339312). This article clarifies that diagonal interleaving is either disabled or it is kept and special means are applied to fill up the channel frame parts with gross bits that are otherwise wasted. There is no mention in Bruhn or the Bruhn article of switching to block interleaving for some of the SID frames.

Therefore, there is no teaching or suggestion in Hamalainen or Bruhn of an AMR communication system that interleaves SID frames such that certain of the transmitted SID frames are interleaved using block interleaving while the source data is block diagonally interleaved.

Independent claims 1 and 25 recite this feature. The Examiner's reconsideration of the pending claims is respectfully requested.

4.) New Claims

New claim 35 is added to reinstate previously canceled claim 22. Claim 35 depends from claim 20 and base claim 16, which recites the novel aspect of carrying codec mode information in an escape frame. Therefore, the allowance of claim 35 is respectfully requested.

New claim 36 depends from base claim 27, which is an apparatus-type claim corresponding to method claim 16. Base claim 27 recites the novel aspect of carrying codec mode information in an escape frame. New claim 36 recites limitations

corresponding to dependent method claim 20. Therefore, the allowance of claim 36 is respectfully requested.

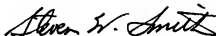
New claim 37 depends from claim 36 and base claim 27. Therefore, the allowance of claim 37 is respectfully requested for the reasons discussed above.

5.) Conclusion

In view of the foregoing remarks, the Applicants believe all of the claims currently pending in the Application to be in condition for allowance. The Applicants, therefore, respectfully request that the Examiner withdraw all rejections and issue a Notice of Allowance for claims 1, 3, 4, 6-13, 16-20, 23, 25, and 27-37.

The Applicants request a telephonic interview if the Examiner has any questions or requires any additional information that would expedite the prosecution of the Application.

Respectfully submitted,



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